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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/654,054	09/03/2003	Siegfried Schwarzl	32226.74	3698

32300 7590 06/15/2004

BRIGGS AND MORGAN, P.A.
2400 IDS CENTER
MINNEAPOLIS, MN 55402

EXAMINER	
MALDONADO, JULIO J	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/654,054	SCHWARZL ET AL.	
	Examin r	Art Unit	
	Julio J. Maldonado	2823	

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-10 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-10 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 4 is objected to because of the following informalities: claim 4, line 1 recites "...further comprising comprising...", should recite –further comprising--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al. (U.S. 6,211,092 B1) in view of Watatani (U.S. 6,153,511).

Tang et al. in a related method to form a damascene interconnect (Figs.1-15) teach the steps of applying a first dielectric layer (12), a second dielectric layer (14), a third dielectric layer (16) and a fourth dielectric layer (20) to a surface of a substrate (10), wherein the first dielectric layer (12) and the third dielectric layer (16), and the second dielectric layer (14) and the fourth dielectric layer (20) have the same composition and etching properties and the thickness of the second dielectric layer (14) differing from the thickness of the fourth dielectric layer (20); using a first etching mask (44), to define the arrangement of a contact hole (122) and etching the fourth (20), third (16) and second (14) dielectric layers by a non-selective etching process comprising a timed etching

process; using a second etching mask (56) to define a line trench (62); selectively etching the first (14) and second (20) dielectric layers with respect to the first (12) and third (16) dielectric layers until the underlying surfaces of the first (12) and of the third (16) dielectric layers are uncovered; etching the third dielectric layer (16) and the first dielectric layer (12) until the underlying surface is uncovered; and producing copper-containing contacts (72) and lines of the metallization plane in the contact holes (122) and in the line trenches (62) by deposition and planarization (column 7, line 5 – column 11, line 33).

Tang et al. fail to teach etching into the fourth dielectric layer and the second dielectric layer using an etching mask to define an arrangement of line trenches by means of which etching is effected into the fourth dielectric layer and the second dielectric layer without the surface of the underlying third dielectric layer and first dielectric layer being uncovered. However, Watatani (Figs.5A-5I) in a related method to form a damascene interconnect teaches etching into a fourth dielectric layer (78) and a second dielectric layer (74) using an etching mask (82) to define an arrangement of line trenches by means of which etching is effected into the fourth dielectric layer (78) and the second dielectric layer (74) without the surface of an underlying third dielectric layer (76) and a first dielectric layer being uncovered (72) (column 7, lines 4-42). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to form the line trenches as taught by Watatani in the interconnect formation method of Tang et al., since this would improve the yield production of the semiconductor device (column 7, lines 49-50).

Still, Tang et al. in combination with Watatani fail to teach that if the thickness of the second dielectric layer is greater than the thickness of the fourth dielectric layer, etching is effected through the fourth dielectric layer and the third dielectric layer into the second dielectric layer to a depth such that the remaining thickness of the second dielectric layer in regions where the contact holes are formed is essentially equal to the thickness of the fourth dielectric layer, and, if the thickness of the fourth dielectric layer is greater than the thickness of the second dielectric layer, etching is effected into the fourth dielectric layer to a depth such that the remaining thickness of the fourth dielectric layer is essentially equal to the thickness of the second dielectric layer. Notwithstanding, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Double Patenting

4. Applicant is advised that should claim 3 be found allowable, claim 4 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Conclusion

5. Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is 571-272-2800. See MPEP 203.08.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax number for this group is 703-872-9306 for before final submissions, 703-872-9306 for after final submissions and the customer service number for group 2800 is (703) 306-3329. Updates can be found at http://www.uspto.gov/web/info/2800.htm.

Julio J. Maldonado

Patent Examiner
Art Unit 2823

Julio J. Maldonado
June 7, 2004

George Fourson
Primary Examiner